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A UNIQUE *AMYCLE* NYMPH (HOMOPTERA: FULGORIDAE) THAT MIMICS JUMPING SPIDERS (ARANEAE: SALTICIDAE)

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Abstract.—An undescribed *Amycle* fulgorid planthopper nymph that mimics jumping spiders when viewed from behind is recorded from Guerrero, Mexico. The nymph has 4 smooth, polished dark areas on its metathorax and hind wing pads that resemble the anterior eyes of jumping spiders. The middle and hind legs, which project posteriorly and have flattened femora and tibiae, were moved in an up and down manner similar to those of salticid legs and pedipalpi. It is hypothesized that such mimicry affords protection from predation by salticids only, not predators in general.

Many spiders mimic insects, especially ants (Reiskind, 1970, 1977; Edmunds, 1978; Foelix, 1982; Jackson, 1982), but the converse has only been observed in the fly family Tephritidae. Monteith (1972) commented on the similarity in appearance and behavior between the apple maggot *Rhagoletis pomonella* (Walsh), the cherry fruit fly *R. cinqulata* (Loew) (Tephritidae), and the sympatric jumping spider *Paraphidippus marginatus* (Walck.) (Salticidae). Eisner's (1985) report that the tephritid *Zonosemata vittigera* (Coquillett) mimicked jumping spiders stimulated a flurry of experiments dealing with the protection afforded by spider mimicry (Mather and Roitberg, 1987; Greene et al., 1987; Whitman et al., 1988).

It has been suggested, but never demonstrated, that other insects also may mimic spiders. O'Brien (1967) reported the behavior and appearance of male *Caliscelis bonellii* (Latreille) (Homoptera: Issidae) strongly resembled that of jumping spiders. Santiago-Blay and Maldonado-Capriles (1988) suggested *Emesa tenerrima* (Dohrn) (Hemiptera: Reduviidae) may mimic the spider *Modisimus signatus* (Banks) (Pholcidae) in Puerto Rico.

I report here a nymph of *Amycle* sp. (Homoptera: Fulgoridae) which closely resembles a salticid spider when viewed from behind. The single specimen, a fourth instar nymph, was collected by sweep-netting in a dryland forest 4.5 miles northwest of El Ocotito, Guerrero, Mexico, on July 7, 1987, by R. A. Wharton. Although seven entomologists were collecting in the area, only the single specimen was caught.

The mimic has four smooth, polished dark areas on the metathorax which imitate the anterior eye row of a salticid, even to the point of reflecting highlights (Figs. 1–3). Furthering the illusion are the middle and hind legs with flattened femora and tibiae. These project posteriorly and simulate the anterior legs and pedipalpi of a jumping spider. The specimen, which is 7.2 mm long and 3.9 mm wide, is approximately the same size as the largest salticid collected from the same locality (Fig. 4). This fulgorid nymph was observed moving its middle and hind legs up and down in a manner similar to that of a salticid courtship or aggression display. The fulgorid was killed and preserved in 70 percent ethanol, critical-point dried, and mounted

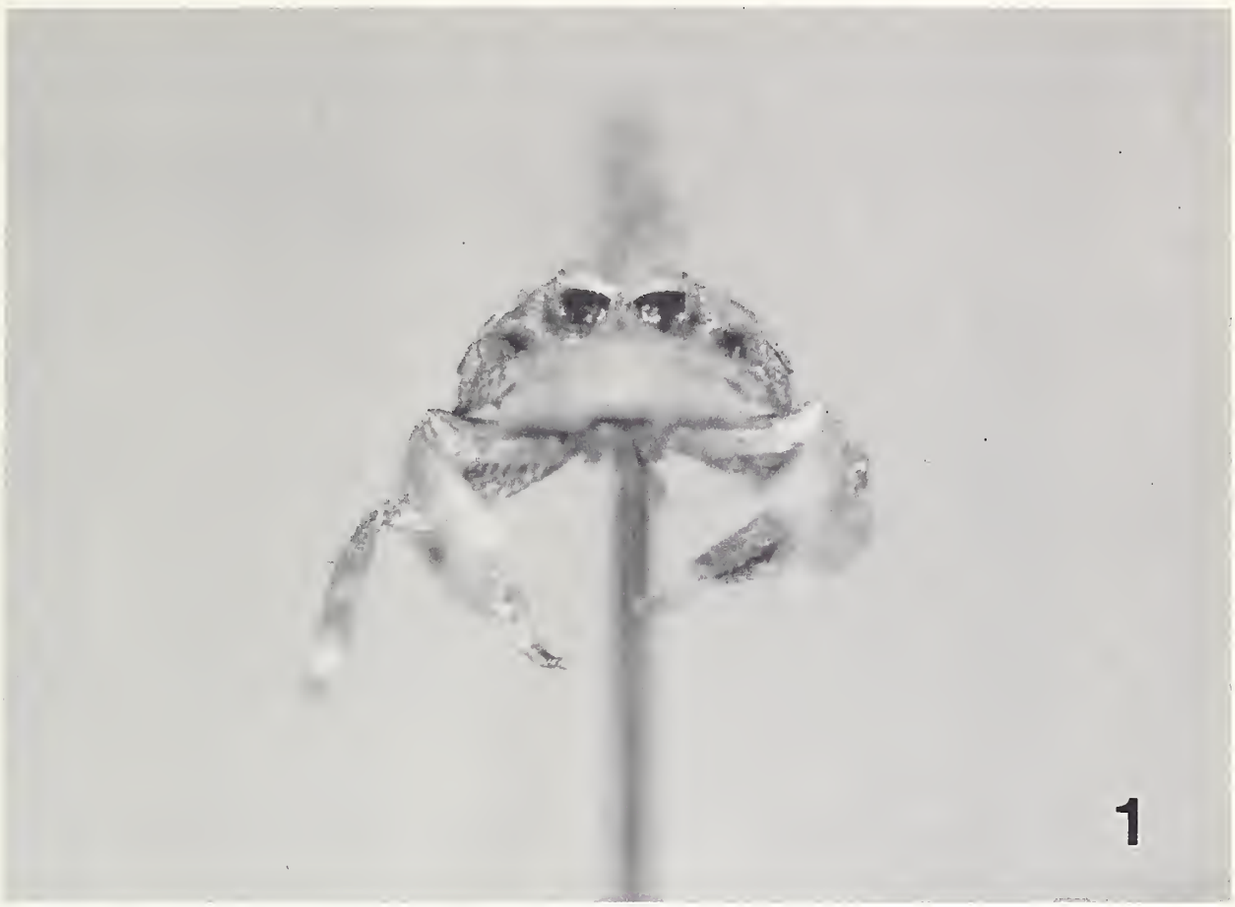

Fig. 1. Posterior view of *Amycle* sp. spider mimic.

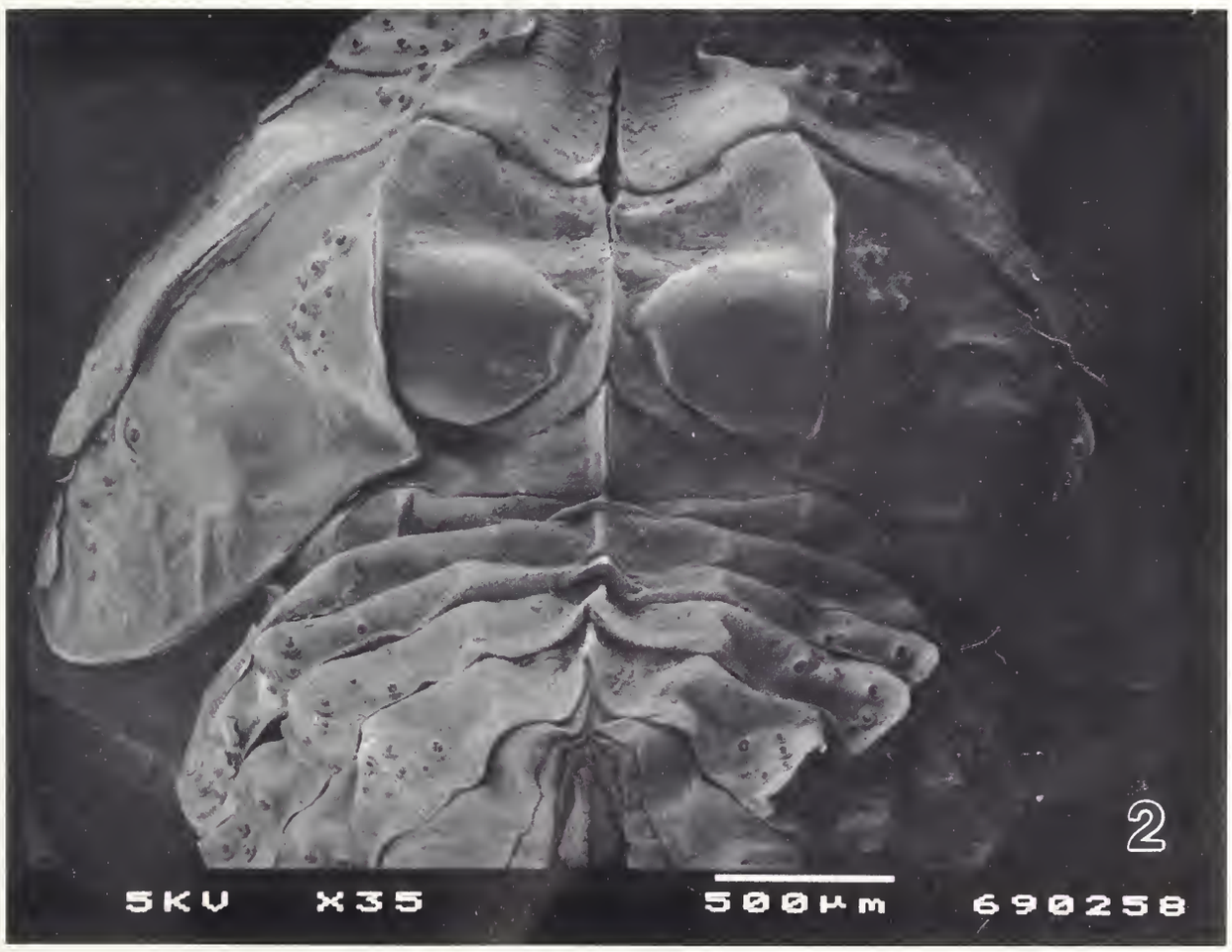

Fig. 2. Posterior view of metathorax and abdomen of *Amycle* sp. showing smooth areas that imitate salticid eyes.

Fig. 3. Posterior dorsal view of *Amycle* sp.

for 35 mm photography. The mimic has been deposited as Voucher Specimen No. 554 in the Texas A&M University Insect Collection. Five earlier instar nymphs of *Amycle* sp. were collected screen-sweeping the area. They lack the flattened femora and tibiae and false eyes of the spider mimic and are not believed to be conspecific with the mimic.

Jumping spiders were the most common cursorial spider collected by screen-sweeping the habitat. All spiders collected were approximately the same size or smaller than the mimic. Salticids present at the collection site were: *Habronattus zebranus* F.O.P.C., *Habronattus* sp., *Metaphidippus* sp., *Nycerella delecta* (Peckhams), *Peckhamia* sp., and *Thiodina* sp. Other cursorial spiders collected from the same habitat were: *Strotarchus* sp. (Clubionidae), *Oxyopes* sp. (Oxyopidae), *Apollophanes* sp. nr. *punctipes* F.O.P.C. (Philodromidae), *Misumenoides* sp., *Misumenops* sp. nr. *dubius* (Keyserling), and *Xysticus facetus* F.O.P.C. (Thomisidae).

As only the single specimen was collected and observed for a short period, it is unknown whether the mimic is modelled after a specific salticid species or jumping

Fig. 4. *Amycle* sp. and the salticid *Nycerella delecta* (Peckhams) collected from the same locality.

spiders in general. Also unknown is whether such mimicry affords protection from a wide range of predators or only from salticids.

The most likely case is that the mimicry is directed solely toward jumping spiders. The behavior of salticids is often stereotyped and mediated by their highly developed visual system. Once an object is visually perceived, a jumping spider will advance in a predatory, agonistic, or courtship mode. If the fulgorid is perceived as another salticid the risk of predation is lessened, since jumping spiders often signal each other during interspecific and intraspecific encounters (Crane, 1949; Forster, 1982) and actual cannibalism or combat does not appear to be common (Crane, 1949).

Previous work supports the hypothesis that this mimicry is designed to deter only jumping spiders. Greene et al. (1987) found salticid mimicry by the tephritid *Z. vittigera* did not deter predation by nonsalticid spiders, mantids, assassin bugs, and whiptail lizards. Whitman et al. (1988) reported salticid mimicry by the same fly protected it from a number of sympatric salticid species. Jumping spiders perceived the flies as other jumping spiders and engaged in agonistic or courtship displays.

Using Vane-Wright's (1976) terminology, this case of a fulgorid mimicking salticids would be Class VI antergic defensive mimicry (Batesian). Here the model and operator (predator) would be the same. Since many species of jumping spiders and fulgorids occur in similar habitats, this type of mimicry may be more common than reported.

The only other apparent case of mimicry in fulgorids occurs in the lanternflies

(*Fulgoria* spp.). Hogue (1984) speculated they avoid predation by mimicking several genera of arboreal lizards.

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LITERATURE CITED

Crane, J. 1949. Comparative biology of salticid spiders at Rancho Grande, Venezuela. Part IV. An analysis of display. Zoologica 34:159–214.

Edmunds, M. 1978. On the association between *Myrmarachne* spp. (Salticidae) and ants. Bull. Br. Arachnol. Soc. 4:149–160.

Eisner, T. 1985. A fly that mimics jumping spiders. Psyche 92:103–104.

Foelix, R. F. 1982. Biology of Spiders. Harvard University Press, Cambridge, Mass.

Forster, L. 1982. Visual communication in jumping spiders (Salticidae). Pages 161–212 *in:* P. Witt and J. Rovner (eds.), Spider Communication: Mechanisms and Ecological Significance. Princeton University Press, Princeton, N.J.

Greene, E., L. J. Orsak and D. W. Whitman. 1987. A tephritid fly mimics the territorial displays of its jumping spider predators. Science 236:310–312.

Hogue, C. L. 1984. Observations on the plant hosts and possible mimicry models of "Lantern Bugs" (*Fulgora* spp.) (Homoptera: Fulgoridae). Rev. Biol. Trop. 32:145–150.

Jackson, R. R. 1982. The biology of ant-like jumping spiders: intraspecific interactions of *Myrmarachne lupata* (Araneae; Salticidae). Zool. J. Linn. Soc. 76:293–319.

Mather, M. H. and B. D. Roitberg. 1987. A sheep in wolf's clothing: tephritid flies mimic spider predators. Science 236:308–310.

Monteith, L. G. 1972. Status of predators of the adult apple maggot, *Rhagoletis pomonella* (Diptera: Tephritidae), in Ontario. Can. Entomol. 104:257–262.

O'Brien, L. B. 1967. *Caliscelis bonellii* (Latreille), a European genus of Issidae new to the United States (Homoptera: Fulgoroidea). Pan-Pacific Entomologist 43:130–133.

Reiskind, J. 1970. Multiple mimetic forms in an ant-mimicking clubionid spider. Science 169:587–588.

Reiskind, J. 1977. Ant-mimicry in Panamanian clubionid and salticid spiders (Araneae: Clubionidae, Salticidae). Biotropica 9:1–8.

Santiago-Blay, J. A. and J. Maldonado-Capriles. 1988. Observations on the true bugs *Emesa tenerrima,* a possible spider mimic, and *Ghilianella borincana* (Hemiptera: Reduviidae: Emesinae) from Puerto Rico. Proc. Entomol. Soc. Wash. 90:369–372.

Vane-Wright, R. I. 1976. A unified classification of mimetic resemblances. Biol. J. Linn. Soc. 8:25–56.

Whitman, D. W., L. Orsak and E. Greene. 1988. Spider mimicry in fruit flies (Diptera: Tephritidae): further experiments on the deterrence of jumping spiders (Araneae: Salticidae) by *Zonosemata vittigera* (Coquillet). Ann. Entomol. Soc. Am. 81:532–536.

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